



Discussion Topics

- Regulatory requirements and bases
- What are the issues?
- Industry experience and activities
 - Callaway experience
 - PJM Nuclear Generation Owners/Operators
 - California Model
 - INPO SOER 99-01







Callaway solutions

- Developed Transmission Provider Agreement clarifying responsibilities and requirements
- Enhanced Transmission Provider operator's real-time contingency analysis computer to effectively monitor switchyard voltage for loss of unit, and trigger appropriate communication to Plant
- Engineered creative transmission system configurations to better control switchyard voltage (immediate response)







PJM NGO Charter (cont'd)

- Define and implement the required relationship between the ISO, NAERO/MAAC, nuclear Operating License Holder, and transmission owner/local control centers relative to issues such as (but not limited to); reliable operation, black start, plant Final Safety Analysis Report (FSAR) issues, and design/control of the Bulk electric system.
- Include all Nuclear Operating License Holders within the PJM control area as official User Group voting Members in the development, review of procedures and protocols to ensure that issues are adequately addressed.



PJM NGO Charter (cont'd)

- Operating License holders shall be proactive and participate in this new world of ISOs, FERC regulations, and NAERO/MAAC grid reliability standards. The User Group shall address two key issues -- a) monitoring as-built Transmission system reliability, and b) consistency and timing of transmission grid modification approvals with FSAR design basis modifications (as deemed necessary).
- Provide the necessary communication infrastructure, an open PJM forum for discussion, and means to proactively resolve such issues.



PJM NGO Activities

PJM System Voltage Operating Criteria

- Incorporates nuclear plant's normal and emergency high and low voltage limits into PJM's Emergency Management System
- Real time actual and post contingency voltage analysis which considers nuclear plant trips
- Actions taken to reconfigure system based on pre- and postcontingency analyses
- PJM will re-dispatch system generation to stay within both pre- and post-contingency voltage limits
- Actions to be incorporated into PJM operating procedures
- INPO SOER 99-01, Loss of Grid
- NRC IN 2000-06, Offsite Power Voltage Inadequacies







Deregulation

- California Assembly Bill 1890 requirements:
 - The ISO shall ensure efficient use and reliable operation of the transmission grid consistent with achievement of planning and operating reserve criteria no less stringent than those established by the Western Systems Coordinating Council (WSCC) and the North American Electric Reliability Council (NERC).
 - The ISO shall immediately participate in all relevant Federal Energy Regulatory Commission (FERC) proceedings.



SONGS Offsite Power Specification ("grid spec")

- Transmission Lines
- Sufficient Capacity
- Minimum Voltage
- Normal Voltage
- Maximum Voltage
- Grid Operating Conditions
- System Studies
- Stability/Availability

- LOOP Priority
- Frequency
- Reliability Criteria
- Patrols
- Inspections/Washing

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- Preventive Maintenance
- UFSAR Update



Grid Operating Conditions

 During certain critical transmission line outages with one SONGS unit off-line, maintain the offsite power system within specified power flows (as determined by system studies). Grid conditions which render the offsite power supply inoperable, or are outside of analyzed conditions, shall be immediately communicated to SCE for operability determination.



Stability/Availability

- The following initiating events *shall not* result in the loss of *grid stability or availability*:
 - The *loss of a San Onofre Unit* (with other unit offline).
 - The loss of any generating unit on the SCE and SDG&E grids.
 - The loss of any major transmission circuit or intertie on the SCE and SDG&E grids.
 - The loss of any large load or block of load on the SCE and SDG&E grids.



Reliability Criteria

- Existing SCE and SDG&E reliability criteria shall be maintained. *Proposed changes* to reliability criteria shall be *assessed* to determine if grid reliability and availability are *adversely impacted*.
- Changes in grid operation due to revised reliability criteria require prior review by SCE.

The Transmission Control Agreement (TCA)

- The TCA is a contract between SCE, SDG&E, PG&E, and the ISO. The TCA has been approved by FERC. The ISO is bound by FERC mandate to operate the grid in accordance with the TCA.
- The San Onofre and Diablo Canyon "grid specs" have been incorporated into the TCA (Appendix E of the TCA).
- Operation of the grid in accordance with the TCA ensures equivalent (or better) grid reliability and operability (with respect to San Onofre offsite power) as prior to deregulation.





Recommendation 1 - establish appropriate interface with the grid operator

- plant coordination with grid maintenance and testing
- plant is made aware of grid status
- plant requirements and status are made known to grid operator
- grid operator is made aware that the plant is an important customer
- responsibilities for grid/switchyard equipment maintenance are clearly defined







Recommendation 5 – operator training

• train on:

- degrade grid voltage
- post loss of grid actions
- manual electrical bus alignments

